



US009364410B2

(12) **United States Patent**  
**Kergosien**(10) **Patent No.:** **US 9,364,410 B2**  
(45) **Date of Patent:** **Jun. 14, 2016**(54) **COSMETIC COMPOSITION COMPRISING A MODIFIED ALPHA-ALKOXY-SILANE**(71) Applicant: **L'OREAL**, Paris (FR)(72) Inventor: **Guillaume Kergosien**, Chaville (FR)(73) Assignee: **L'OREAL**, Paris (FR)

(\*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 22 days.

(21) Appl. No.: **14/357,286**(22) PCT Filed: **Nov. 9, 2012**(86) PCT No.: **PCT/IB2012/056284**

§ 371 (c)(1),

(2) Date: **May 9, 2014**(87) PCT Pub. No.: **WO2013/068971**PCT Pub. Date: **May 16, 2013**(65) **Prior Publication Data**

US 2014/0343016 A1 Nov. 20, 2014

**Related U.S. Application Data**

(60) Provisional application No. 61/565,520, filed on Dec. 1, 2011.

(30) **Foreign Application Priority Data**

Nov. 9, 2011 (FR) ..... 11 60218

(51) **Int. Cl.****A61K 8/58** (2006.01)**A61Q 3/02** (2006.01)**A61K 8/89** (2006.01)**A61Q 1/00** (2006.01)**A61Q 1/06** (2006.01)**A61Q 1/10** (2006.01)**A61Q 5/00** (2006.01)**A61Q 19/00** (2006.01)**A61Q 19/08** (2006.01)(52) **U.S. Cl.**CPC . **A61K 8/585** (2013.01); **A61Q 3/02** (2013.01);**A61K 2800/94** (2013.01); **A61Q 1/00** (2013.01);**A61Q 1/06** (2013.01); **A61Q 1/10** (2013.01);**A61Q 5/00** (2013.01); **A61Q 19/00** (2013.01);**A61Q 19/08** (2013.01)(58) **Field of Classification Search**CPC ..... **A61K 8/585**; **A61K 8/89**; **A61K 2800/94**;**A61Q 1/00**; **A61Q 1/06**; **A61Q 1/10**; **A61Q****3/02**; **A61Q 5/00**; **A61Q 19/00**; **A61Q 19/08**;**A61Q 1/02**

See application file for complete search history.

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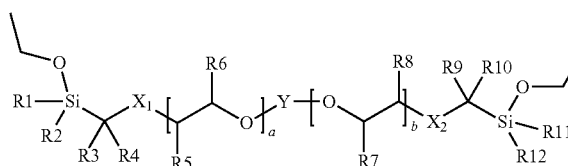
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## (57)

**ABSTRACT**

The invention relates to a cosmetic composition, in particular a composition for making up and/or caring for keratin materials, preferably a nail makeup, comprising the compound of chemical formula (I) below: (I) in which: a and b independently represent an integer between 0 and 20; R1, R2, R11 and R12 independently represent an ethoxy group, a group (C<sub>1</sub>-C<sub>20</sub>)alkyl optionally substituted with an amino group; R3, R4, R5, R6, R7, R8, R9 and R10 independently represent a hydrogen atom or a group (C<sub>1</sub>-C<sub>10</sub>)alkyl; X1 and X2 independently represent a carboxyl, carbamate, amide, carbonate, ureido or sulfonate group, an oxygen atom or a NH group; Y represents a hydrocarbon-based group comprising from 2 to 800 carbon atoms, the said hydrocarbon-based group being a linear or branched divalent group, bearing one or more aromatic or non-aromatic rings. The invention also relates to a cosmetic process, characterized in that it comprises at least one step which consists in applying a cosmetic composition as above defined to keratin materials.

(I)

**15 Claims, No Drawings**

(56)

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## 2

“between” denotes inclusively between.

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The compound of formula (I) according to the invention in which X1 and X2 represent a carbamate may be obtained in particular by reaction between an alpha-chloro ethoxysilane, a cyanate and a diol, in the presence of a catalyst such as a tin salt.

The starting materials are either commercially available or obtained according to methods known to those skilled in the art.

As regards the alpha-chloro ethoxysilanes, examples that may be mentioned include (chloromethyl)triethoxysilane sold by Sigma Aldrich under the name 391042.

As regards the cyanates, examples that may be mentioned include potassium cyanate sold by Sigma Aldrich under the name 215074.

As regards the diol, examples that may be mentioned include bisphenol A sold by Sigma Aldrich under the name 239658.

As regards the catalyst, examples that may be mentioned include dibutyltin dilaurate sold by Sigma Aldrich under the name 34930.

The invention also relates to a cosmetic process, in particular a makeup or hair shaping process, preferably a process for making up keratin materials, in particular the nails and/or the hair, comprising at least one step which consists in applying the cosmetic composition according to the invention to keratin materials.

A cosmetic composition according to the present invention is a liquid.

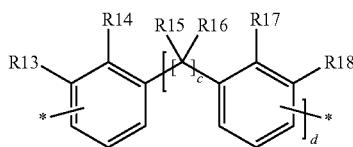
In the context of the present invention, the term "liquid composition" means a composition which has a particular viscosity at room temperature, i.e. at 20° C.

More specifically, a liquid composition has, at 20° C., a viscosity ranging from 0.001 to 20 Pa/s, preferably from 0.01 to 10 Pa/s and even more preferably from 0.1 to 2 Pa/s.

The viscosity measurement may be carried out at 20° C. using a Rheomat RM180 viscometer equipped with a No. 4 rotor, the measurement being performed after 10 minutes of rotation of the rotor in the composition (after which time stabilization of the viscosity and of the spin speed are observed), at a shear rate of 200 s<sup>-1</sup>.

#### Alpha-Alkoxysilanes

According to one of its aspects, a subject of the present invention is a composition comprising the compound of chemical formula (I) for which Y represents a group chosen from one of the groups of formulae (II) and (III) below:



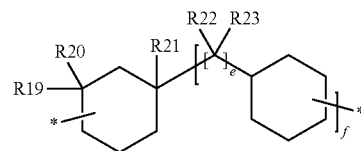
in which:

c is an integer between 0 and 10 and preferably between 1 and 2,

d is an integer between 0 and 3 and preferably between 0 and 1,

R13, R14, R15, R16, R17 and R18 independently represent a hydrogen atom or a group (C<sub>1</sub>-C<sub>10</sub>)alkyl, preferably a methyl or a hydrogen atom;

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in which:

e is an integer between 0 and 10 and preferably between 1 and 2,

f is an integer between 0 and 3 and preferably between 0 and 1,

R19, R20, R21, R22 and R23 independently represent a hydrogen atom or a group (C<sub>1</sub>-C<sub>10</sub>)alkyl, preferably a methyl or a hydrogen atom.

According to one particular embodiment, a subject of the present invention is a cosmetic composition comprising the compound of chemical formula (I) for which a and b independently represent an integer between 0 and 3.

According to one particular embodiment, a subject of the present invention is a cosmetic composition comprising the compound of chemical formula (I) for which R1, R2, R11 and R12 independently represent a methyl group, an ethoxy group or a group (C<sub>1</sub>-C<sub>3</sub>)aminoalkyl.

According to one particular embodiment, a subject of the present invention is a cosmetic composition comprising the compound of chemical formula (I) for which R3, R4, R5, R6, R7, R8, R9 and R10 independently represent a methyl group or a hydrogen atom.

According to one particular embodiment, a subject of the present invention is a cosmetic composition comprising the compound of chemical formula (I) for which X1 and/or X2 represent a carbamate group.

According to one preferred embodiment, a subject of the present invention is a cosmetic composition comprising the compound of chemical formula (I) in a content of greater than or equal to 20% by weight and preferably greater than 50% by weight relative to the total weight of the composition.

#### Composition

The composition according to the invention is preferably anhydrous.

The term "anhydrous" refers to a composition comprising a content of less than or equal to 0.5% by weight of water relative to the total weight of the composition. The term "anhydrous" especially means that water is preferably not deliberately added to the compositions, but may be present in trace amount in the various compounds used in the compositions.

According to one particular embodiment, the composition according to the invention has a solids content of greater than or equal to 20% and preferably greater than 50%.

For the purposes of the present invention, the term "solids content" denotes the content of non-volatile matter after film-forming.

The solids content (abbreviated as SC) of a composition according to the invention is measured using a "Halogen Moisture Analyzer HR83" commercial halogen desiccator from Mettler Toledo. The measurement is performed on the basis of the weight loss of a sample dried by halogen heating, and thus represents the percentage of residual matter once the water and the volatile matter have evaporated off.

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This technique is fully described in the machine documentation supplied by Mettler Toledo.

The measuring protocol is as follows:

Approximately 2 g of the composition, referred to hereinbelow as the sample, are spread out on a metal crucible, which is placed in the halogen desiccator mentioned above. The sample is then subjected to a temperature of 120° C. for 1 hour. The wet mass of the sample, corresponding to its initial mass, and the dry mass of the sample, corresponding to its mass after halogen heating, are measured using a precision balance.

The values measured by means of the protocol described above may differ from the corresponding theoretical values by plus or minus 1%.

The solids content is calculated in the following manner:

$$\text{Solid content (expressed as weight percentage)} = 100 \times \frac{\text{(dry mass/wet mass)}}{\text{(dry mass/wet mass)}}$$

Other Alkoxysilane Compound According to one particular embodiment, the composition according to the present invention also comprises at least one other compound comprising at least one alkoxysilane group.

The term “compound comprising at least one alkoxysilane group” preferably denotes a compound of formula  $\text{Si}(\text{OR}^2)_4$  or of formula  $\text{R}^1_x\text{Si}(\text{OR}^2)_{(4-x)}$  or of formula  $[\text{R}^1_y(\text{OR}^2)_z\text{SiO}_{((4-y-z)/2)}]_n$  in which:

$\text{R}^1$  represents, independently, a nucleophilic group other than a silanol, or a group  $(\text{C}_1\text{-C}_{20})\text{alkyl}$ , optionally substituted with at least one nucleophilic group other than a silanol,

$\text{R}^2$  represents, independently, a hydrogen atom or a group  $(\text{C}_1\text{-C}_{10})\text{alkyl}$ ,

$x$  represents 1 or 2,

$y$  represents, independently, 1 or 2,

$z$  represents, independently, 0, 1 or 2,

the sum of  $y$  and  $z$  being less than or equal to 3,

and  $n$  represents an integer between 2 and 1000.

Polar Volatile Solvent

According to one particular embodiment, the composition according to the present invention also comprises at least one polar volatile solvent.

The term “polar volatile solvent” denotes, in the present invention, a compound which is liquid at ambient temperature, which comprises at least one polar group such as a hydroxyl, ester, ketone, ether or aldehyde group, and which has a vapour pressure greater than 1 mbar at 20° C.

Among the polar volatile solvents that may be used in the compositions in accordance with the invention, mention may be made especially of lower monoalcohols containing from 1 to 5 carbon atoms such as ethanol and isopropanol,  $\text{C}_3\text{-C}_4$  ketones,  $\text{C}_2\text{-C}_4$  aldehydes and  $\text{C}_2\text{-C}_4$  short-chain esters, and mixtures thereof. Preferably, the polar volatile solvents are chosen from  $\text{C}_3\text{-C}_4$  ketones, preferentially acetone, and  $\text{C}_2\text{-C}_4$  short-chain esters, preferentially ethyl acetate, and mixtures thereof.

Film-Forming Polymer

According to one particular embodiment, the composition according to the invention may also comprise at least one film-forming polymer. In particular, when the composition according to the present invention is in the form of a nail varnish, such a film-forming polymer may advantageously be present in the composition.

For the purposes of the present invention, the term “film-forming polymer” denotes a polymer that is capable, by itself or in the presence of an auxiliary film-forming agent, of forming an isolable and especially continuous and adherent film, on a support. This support may especially be the nails.

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A single film-forming polymer or a mixture of film-forming polymers may be used in the composition.

This film-forming polymer may be chosen from the group formed by synthetic polymers of radical type or of polycondensate type, and polymers of natural origin, and mixtures thereof.

According to the invention, film-forming polymers that are soluble or dispersible in an organic solvent may be used.

A film-forming polymer that is suitable for use in the invention may be chosen in particular from:

polysaccharides. Among the polysaccharides that are suitable for use in the invention, examples that may be mentioned include cellulose esters and ethers, such as nitrocellulose, cellulose acetate, cellulose acetobutyrate, cellulose acetopropionate and ethylcellulose, or alternatively optionally modified guar gum, such as ethylguar;

synthetic polymers such as polyurethanes, acrylic polymers, vinyl polymers, polyvinyl butyrals, alkyd resins and ketone/aldehyde resins, resins derived from aldehyde condensation products, such as arylsulfonamide-formaldehyde resins, for instance toluenesulfonamide-formaldehyde resin, arylsulfonamide-epoxy resins or ethyl tosylamide resins;

polymers of natural origin, such as plant resins, such as dammar resins, elemi gums, copal resins, and benzoin; gums such as shellac, sandarac gum and gum mastic.

Use may in particular be made, as film-forming polymers, of the toluenesulfonamide/formaldehyde resins Ketjentflex MS80 from Akzo or Santolite MHP or Santolite MS 80 from Faconnier or Resimpol 80 from Pan Americana, the alkyd resin Beckosol ODE 230-70-E from Dainippon, the acrylic resin Acryloid B66 from Röhm & Haas, the polyurethane resin Trixene PR 4127 from Baxenden or the acetophenone/formaldehyde resin sold under the reference Synthetic Resin SK by Degussa.

According to one particular embodiment, the film-forming polymer is chosen from polysaccharides or polysaccharide derivatives, preferably from nitrocellulose, and cellulose ethers and esters.

For example, the content of film-forming polymer may range from 0.1% to 30% by weight, especially from 0.5% to 20% by weight and in particular from 1% to 10% by weight relative to the total weight of the composition.

According to one particular embodiment, the composition according to the invention comprises as film-forming polymer at least cellulose derivatives, polyesters or polyurethanes.

Plasticizer

According to one particular embodiment, the composition according to the invention comprises at least one plasticizer.

In particular, mention may be made, alone or as mixtures, of plasticizers such as:

glycols containing from 2 to 8 carbon atoms such as glycerol, propylene glycol, 1,3-butylene glycol and dipropylene glycol,

glycol derivatives such as diethylene glycol ethyl ether, diethylene glycol methyl ether, diethylene glycol butyl ether or diethylene glycol hexyl ether, ethylene glycol ethyl ether, ethylene glycol butyl ether and ethylene glycol hexyl ether, glycol esters,

propylene glycol derivatives and in particular propylene glycol phenyl ether, propylene glycol diacetate, dipropylene glycol butyl ether, tripropylene glycol butyl ether, propylene glycol methyl ether, dipropylene glycol ethyl ether, tripropylene glycol methyl ether, diethylene glycol methyl ether and propylene glycol butyl ether,

fatty alcohols that are liquid at ambient temperature, with a branched and/or unsaturated carbon-based chain containing

from 12 to 26 carbon atoms, for instance 2-octyldodecanol, isostearyl alcohol, oleyl alcohol, 2-hexyldecanol, 2-butyloc-tanol and 2-undecylpentadecanol,

higher fatty acids such as oleic acid, linoleic acid or lino-  
lenic acid, and mixtures thereof,

esters of acids, in particular carboxylic acids, such as the monoesters of formula  $R_1COOR_2$  in which  $R_1$  represents the residue of a linear or branched acid comprising from 1 to 40 carbon atoms and  $R_2$  represents a hydrocarbon-based chain, which is in particular branched, containing from 1 to 40 carbon atoms, provided that  $R_1+R_2>10$ , triglycerides consist-  
ing of fatty acid esters glycerol, the fatty acids of which can have varied chain lengths from  $C_4$  to  $C_{24}$ , citrates, in particu-  
lar triethyl citrate, tributyl citrate, triethyl acetylcitrate, tribu-  
tyl acetylcitrate, 2-triethylhexyl acetylcitrate; phthalates, in  
particular diethyl phthalate, dibutyl phthalate, dioctyl phtha-  
late, dipentyl phthalate, dimethoxyethyl phthalate; trimelli-  
tates such as, in particular, tris(2-ethylhexyl) trimellitate,  
L7,9-trimellitate, L8,10-trimellitate; phosphates, in particu-  
lar tricresyl phosphate, tributyl phosphate, triphenyl phos-  
phate, tributoxyethyl phosphate; tartrates, in particular dibu-  
tyl tartrate; adipates, such as, in particular, diethyl adipate and  
diisobutyl adipate; carbonates; sebacates; benzyl benzoate,  
butyl acetylricinoleate, glyceryl acetylricinoleate, butyl gly-  
colate, glyceryl triacetate, plasticizers of polyester type,  
camphor,

N-ethyl-o,p-toluenesulfonamide,  
oxyethylenated derivatives such as oxyethylenated oils, in  
particular vegetable oils such as castor oil,

linear or branched hydrocarbons of mineral or synthetic  
origin, such as petroleum jelly, polydecenes, hydrogenated  
polyisobutene such as Parleam®, and squalane, and mixtures  
thereof, and in particular hydrogenated polyisobutene,

silicone oils. The silicone oils that may be used in the  
composition may be non-volatile polydimethylsiloxanes  
(PDMSs), polydimethylsiloxanes comprising alkyl or alkoxy  
groups that are pendent and/or at the end of a silicone chain,  
these groups each containing from 2 to 24 carbon atoms,  
phenyl silicones, for instance phenyl trimethicones, phenyl  
dimethicones, phenyltrimethylsiloxydiphenylsiloxanes,  
diphenyl dimethicones, diphenylmethylidiphenyltrisiloxanes  
and 2-phenylethyl trimethylsiloxysilicates, and dimethicones  
or phenyl trimethicones with a viscosity of less than or equal  
to 100 cSt, and mixtures thereof,  
and mixtures thereof

The type and amount of plasticizer may be chosen by a  
person skilled in the art on the basis of his general knowledge.

For example, the plasticizer content may range from 0.01%  
to 10% and in particular from 1% to 5% by weight relative to  
the total weight of the composition.

According to one particular embodiment, the composition  
according to the invention comprises as plasticizer at least  
one fatty alcohol, or a carboxylic acid ester or polyester.

#### Wax(es)

The composition according to the invention preferably  
comprises at least one wax.

The wax(es) under consideration in the context of the  
present invention are generally a lipophilic compound that is  
solid at room temperature (25° C.), with a solid/liquid revers-  
ible change of state, having a melting point of greater than or  
equal to 30° C., which may be up to 200° C. and in particular  
up to 120° C.

In particular, the waxes that are suitable for the invention  
may have a melting point of greater than or equal to 45° C. and  
in particular of greater than or equal to 55° C.

For the purposes of the invention, the melting point corre-  
sponds to the temperature of the most endothermic peak

observed on thermal analysis (DSC) as described in standard  
ISO 11357-3; 1999. The melting point of the wax may be  
measured using a differential scanning calorimeter (DSC),  
for example the calorimeter sold under the name DSC Q2000  
by the company TA Instruments.

Preferably, the waxes have a heat of fusion  $\Delta H_f$  of greater  
than or equal to 70 J/g.

Preferably, the waxes comprise at least one crystallizable  
part, which is visible by X-ray observation.

The measuring protocol is as follows:

A sample of 5 mg of wax placed in a crucible is subjected  
to a first temperature rise ranging from -20° C. to 120° C., at  
a heating rate of 10° C./minute, is then cooled from 120° C. to  
-20° C. at a cooling rate of 10° C./minute and is finally  
subjected to a second temperature rise ranging from -20° C.  
to 120° C. at a heating rate of 5° C./minute. During the second  
temperature rise, the following parameters are measured:

the melting point ( $T_f$ ) of the wax, as mentioned previously  
corresponding to the temperature of the most endothermic  
peak of the melting curve observed, representing the varia-  
tion of the difference in power absorbed as a function of the  
temperature,

$\Delta H_f$ : the heat of fusion of the wax, corresponding to the  
integral entire melting curve obtained. This heat of fusion  
of the wax is the amount of energy required to make the  
compound change from the solid state to the liquid state. It  
is expressed in J/g.

The waxes that may be used in the composition according  
to the invention are chosen from waxes that are solid at room  
temperature, of animal, plant, mineral or synthetic origin, and  
mixtures thereof.

As illustrations of waxes that are suitable for the invention,  
mention may be made especially of hydrocarbon-based  
waxes, for instance beeswax, lanolin wax, Chinese insect  
waxes, rice bran wax, carnauba wax, candelilla wax, ouricury  
wax, esparto grass wax, berry wax, shellac wax, Japan wax  
and sumach wax; montan wax, orange wax and lemon wax,  
microcrystalline waxes, paraffins and ozokerite; polyethyl-  
ene waxes, the waxes obtained by Fischer-Tropsch synthesis  
and waxy copolymers, and also esters thereof.

Mention may also be made of waxes obtained by catalytic  
hydrogenation of animal or plant oils containing linear or  
branched  $C_8$ - $C_{32}$  fatty chains. Among these, mention may be  
made especially of isomerized jojoba oil such as the trans-  
isomerized partially hydrogenated jojoba oil manufactured or  
sold by the company Desert Whale under the trade reference  
Iso-Jojoba-50®, hydrogenated sunflower oil, hydrogenated  
castor oil, hydrogenated coconut oil, hydrogenated lanolin  
oil, and the bis(1,1,1-trimethylolpropane)tetrastearate sold  
under the name Hest 2T-4S® by the company Heterene.

Mention may also be made of silicone waxes ( $C_{30-45}$  alkyl  
dimethicone) and fluoro waxes.

The waxes obtained by hydrogenation of castor oil esteri-  
fied with cetyl alcohol, sold under the names Phytowax ricin  
16L64® and 22L73® by the company Sophim, may also be  
used. Such waxes are described in Application FR-A-2 792  
190.

A wax that may be used is a  $C_{20}$ - $C_{40}$  alkyl (hydroxysteary-  
loxy)stearate (the alkyl group containing from 20 to 40 car-  
bon atoms), alone or as a mixture.

Such a wax is especially sold under the names Kester Wax  
K 82 P®, Hydroxypolyester K 82 P® and Kester Wax K 80  
P® by the company Koster Keunen.

As microwaxes that may be used, mention may be made  
especially of carnauba microwaxes, such as the product sold  
under the name MicroCare 350® by the company Micro  
Powders, synthetic microwaxes, such as the product sold

under the name MicroEase 114S® by the company Micro Powders, microwaxes consisting of a mixture of carnauba wax and polyethylene wax, such as the products sold under the names Micro Care 300® and 310® by the company Micro Powders, microwaxes consisting of a mixture of carnauba wax and of synthetic wax, such as the product sold under the name Micro Care 325® by the company Micro Powders, polyethylene microwaxes, such as the products sold under the names Micropoly 200®, 220®, 220L® and 250S® by the company Micro Powders, and polytetrafluoroethylene microwaxes, such as the products sold under the names Microslip 519® and 519 L®, by the company Micro Powders.

Preferably, the composition according to the invention may comprise at least one hydrocarbon-based wax, preferably chosen from polyethylene waxes, microcrystalline waxes and ozokerite, and mixtures thereof.

Preferably, the first composition according to the invention comprises at least one polyethylene wax.

Preferably, the composition according to the invention comprises a content of wax(es) ranging from 0.1% to 40% by weight relative to the total weight of the composition; it may in particular contain from 0.5% to 20% and more particularly from 1% to 10% thereof.

#### Pasty Fatty Substances

The composition according to the invention may also comprise at least one pasty fatty substance.

For the purposes of the present invention, the term "pasty fatty substance" means a lipophilic fatty compound with a reversible solid/liquid change of state, comprising at a temperature of 23° C. a liquid fraction and a solid fraction.

In other words, the starting melting point of the pasty compound can be less than 23° C. The liquid fraction of the pasty compound measured at 23° C. can represent 9% to 97% by weight of the compound. This liquid fraction at 23° C. preferably represents between 15% and 85% and more preferably between 40% and 85% by weight.

Preferably, the pasty fatty substances have an end melting point of less than 60° C.

Preferably, the pasty fatty substances have a hardness of less than or equal to 6 MPa.

Preferably, the pasty fatty substances have, in the solid state, an anisotropic crystal organization, which is visible by X-ray observation.

For the purpose of the invention, the melting point corresponds to the temperature of the most endothermic peak observed on thermal analysis (DSC) as described in Standard ISO 11357-3: 1999. The melting point of a pasty substance or of a wax may be measured using a differential scanning calorimeter (DSC), for example the calorimeter sold under the name DSC Q2000 by the company TA Instruments.

As regards the measurement of the melting point and the determination of the end melting point, the sample preparation and measurement protocols are as follows:

A sample of 5 mg of pasty fatty substance, preheated to 80° C. and withdrawn with magnetic stirring using a spatula that is also heated, is placed in a hermetic aluminium capsule, or a crucible. Two tests are performed to ensure the reproducibility of the results.

The measurements are performed on the abovementioned calorimeter. The oven is flushed with nitrogen. Cooling is performed by an RCS 90 heat exchanger. The sample is then subjected to the following protocol: it is first placed at a temperature of 20° C., and then subjected to a first temperature rise passing from 20° C. to 80° C., at a heating rate of 5° C./minute, then is cooled from 80° C. to -80° C. at a cooling rate of 5° C./minute and finally subjected to a second temperature rise passing from -80° C. to 80° C. at a heating rate

of 5° C./minute. During the second temperature rise, the variation in the difference between the power absorbed by the empty crucible and the crucible containing the sample of paste or wax as a function of the temperature is measured. The melting point of the compound is the value of the temperature corresponding to the top of the peak of the curve representing the variation in the difference in power absorbed as a function of the temperature.

The end melting point corresponds to the temperature at which 95% of the sample has melted.

The liquid fraction by weight of the pasty compound at 23° C. is equal to the ratio of the heat of fusion consumed at 23° C. to the heat of fusion of the pasty compound.

The heat of fusion of the pasty compound is the heat consumed by the compound in order to pass from the solid state to the liquid state. The pasty compound is said to be in the solid state when all of its mass is in crystalline solid form. The pasty compound is said to be in the liquid state when all of its mass is in liquid form.

The heat of fusion of the pasty compound is equal to the integral of the entire melting curve obtained using the abovementioned colorimeter, with a temperature rise of 5 or 10° C./minute, according to standard ISO 11357-3:1999. The heat of fusion of the pasty compound is the amount of energy required to make the compound change from the solid state to the liquid state. It is expressed in J/g.

The enthalpy of fusion consumed at 23° C. is the amount of energy absorbed by the sample to change from the solid state to the state that it has at 23° C., composed of a liquid fraction and a solid fraction.

The liquid fraction of the pasty compound measured at 32° C. preferably represents from 30% to 100% by weight of the compound, preferably from 50% to 100%, more preferably from 60% to 100% by weight of the compound. When the liquid fraction of the pasty compound measured at 32° C. is equal to 100%, the temperature of the end of the melting range of the pasty compound is less than or equal to 32° C.

The liquid fraction of the pasty compound measured at 32° C. is equal to the ratio of the heat of fusion consumed at 32° C. to the heat of fusion of the pasty compound. The enthalpy of fusion consumed at 32° C. is calculated in the same way as the enthalpy of fusion consumed at 23° C.

As regards the measurement of the hardness, the sample preparation and measurement protocols are as follows:

The pasty fatty substance is placed in a mould 75 mm in diameter, which is filled to about 75% of its height. In order to overcome the thermal history and to control the crystallization, the mould is placed in a Vötsch VC 0018 programmable oven, where it is first placed at a temperature of 80° C. for 60 minutes, then cooled from 80° C. to 0° C. at a cooling rate of 5° C./minute, and then left at the stabilized temperature of 0° C. for 60 minutes, and then subjected to a temperature rise ranging from 0° C. to 20° C. at a heating rate of 5° C./minute, and then left at the stabilized temperature of 20° C. for 180 minutes.

The compression force measurement is taken using a TA/TX2i texturometer from Swantech. The spindle used is chosen according to the texture:

cylindrical steel spindle 2 mm in diameter for very rigid starting materials;

cylindrical steel spindle 12 mm in diameter for sparingly rigid starting materials.

The measurement comprises three steps: a first step after automatic detection of the surface of the sample, where the spindle moves at a measuring speed of 0.1 mm/s, and penetrates into the pasty fatty substance to a penetration depth of 0.3 mm, the software notes the maximum force value

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reached; a second "relaxation" step where the spindle remains at this position for one second and the force is noted after 1 second of relaxation; finally, a third "withdrawal" step in which the spindle returns to its initial position at a speed of 1 mm/s, and the probe withdrawal energy (negative force) is noted.

The hardness value measured during the first step corresponds to the maximum compression force measured in newtons divided by the area of the texturometer cylinder expressed in mm<sup>2</sup> in contact with the pasty fatty substance. The hardness value obtained is expressed in megapascals or MPa.

The pasty fatty compound may preferably be chosen from synthetic compounds and compounds of plant origin. A pasty fatty substance may be obtained by synthesis from starting materials of plant origin.

The pasty fatty substance is advantageously chosen from: lanolin and derivatives thereof, such as lanolin alcohol, oxyethylenated lanolins, acetylated lanolin, lanolin esters such as isopropyl lanolate, and oxypropylenated lanolins,

polymeric or non-polymeric silicone compounds, for instance polydimethylsiloxanes of high molecular masses, polydimethylsiloxanes containing side chains of the alkyl or alkoxy type containing from 8 to 24 carbon atoms, especially stearyl dimethicones,

polymeric or non-polymeric fluoro compounds, vinyl polymers, especially: olefin homopolymers, olefin copolymers, hydrogenated diene homopolymers and copolymers, linear or branched oligomers, homopolymers or copolymers of alkyl (meth)acrylates preferably containing a C<sub>8</sub>-C<sub>30</sub> alkyl group,

oligomers, homopolymers and copolymers of vinyl esters containing C<sub>8</sub>-C<sub>30</sub> alkyl groups, oligomers, homopolymers and copolymers of vinyl ethers containing C<sub>8</sub>-C<sub>30</sub> alkyl groups,

liposoluble polyethers resulting from the polyetherification between one or more C<sub>2</sub>-C<sub>100</sub> and preferably C<sub>2</sub>-C<sub>50</sub> diols,

esters and polyesters, and mixtures thereof.

The pasty fatty substance may be a polymer, especially a hydrocarbon-based polymer.

Among the liposoluble polyethers, mention may be made especially of copolymers of ethylene oxide and/or of propylene oxide with C<sub>6</sub>-C<sub>30</sub> alkylene oxides. Preferably, the weight ratio of the ethylene oxide and/or propylene oxide to the alkylene oxides in the copolymer is from 5/95 to 70/30. In this family, mention will be made especially of block copolymers comprising C<sub>6</sub>-C<sub>30</sub> alkylene oxide blocks with a molecular weight ranging from 1000 to 10 000, for example a polyoxyethylene/polydodecylene glycol block copolymer such as the ethers of dodecanediol (22 mol) and of polyethylene glycol (45 oxyethylene or OE units) sold under the brand name Elfacos ST9 by Akzo Nobel.

Among the esters, the following are especially preferred: esters of a glycerol oligomer, especially diglycerol esters, in particular condensates of adipic acid and of glycerol, for which some of the hydroxyl groups of the glycerols have reacted with a mixture of fatty acids such as stearic acid, capric acid, stearic acid and isostearic acid, and 12-hydroxystearic acid, especially such as those sold under the brand name Softisan 649 by the company Sasol;

phytosterol esters; pentaerythritol esters; esters formed from:

at least one C<sub>16-40</sub> alcohol, at least one of the alcohols being a Guerbet alcohol, and

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from a diacid dimer formed from at least one C<sub>18-40</sub> unsaturated fatty acid, such as the ester of a dimer of fatty acids and of tall oil comprising 36 carbon atoms and of a mixture i) of Guerbet alcohols comprising 32 carbon atoms and ii) of behenyl alcohol; the ester of a dimer of linoleic acid and of a mixture of two Guerbet alcohols, 2-tetradecyloctadecanol (32 carbon atoms) and 2-hexadecyleicosanol (36 carbon atoms);

non-crosslinked polyesters resulting from the polycondensation between a linear or branched C<sub>4</sub>-C<sub>50</sub> dicarboxylic acid or polycarboxylic acid and a C<sub>2</sub>-C<sub>50</sub> diol or polyol,

polyesters resulting from the esterification between a polycarboxylic acid and an aliphatic hydroxylated carboxylic acid, such as Risocast DA-L and Risocast DA-H sold by the Japanese company Kokyu Alcohol Kogyo, which are esters resulting from the esterification reaction of hydrogenated castor oil with dilinoleic acid or isostearic acid; and

aliphatic esters of an ester resulting from the esterification between an ester of an aliphatic hydroxycarboxylic acid and an aliphatic carboxylic acid, for example the product sold under the trade name Salacos HCIS (V)-L by the company Nissin Oil.

A Guerbet alcohol is the reaction product of the Guerbet reaction, which is well known to those skilled in the art. It is a reaction for transforming a primary aliphatic alcohol into its  $\beta$ -alkyl dimeric alcohol with loss of one equivalent of water.

According to a first embodiment, the composition according to the invention is free of pasty fatty substances.

According to a second embodiment, the composition according to the invention comprises at least one pasty fatty substance. The pasty fatty substance(s) may be present in an amount ranging from 0.1% to 40% by weight and especially from 1% to 20% by weight relative to the total weight of the composition.

#### 35 Pulverulent Phase

A composition according to the invention may comprise a pulverulent phase.

The content of the said pulverulent phase may be between 0.01% and 40% by weight, in particular between 0.1% and 30% by weight and more particularly between 0.1% and 20% by weight relative to the total weight of the composition.

The pulverulent phase may comprise at least one filler and/or at least one colouring agent.

#### Fillers

The term "fillers" should be understood as meaning colourless or white, mineral or synthetic particles of any shape, which are insoluble in the medium of the composition, irrespective of the temperature at which the composition is manufactured.

The additional fillers may be chosen from fillers such as: silica microspheres, especially of open porosity or, preferably, hollow silica microspheres, such as the products Silica Beads SB 700/HA or Silica Beads SB 700 from the company Maprecos; these microspheres may be impregnated with a cosmetic active agent;

microporous polymer microspheres, which have a structure similar to that of a sponge; they generally have a specific surface area of at least 0.5 m<sup>2</sup>/g and in particular of at least 1 m<sup>2</sup>/g, the said specific surface area having no upper limit other than that resulting from the practical possibility of making microspheres of very high porosity: the specific surface area may, for example, be up to 1000 m<sup>2</sup>/g or even more. Microspheres that may be mentioned include acrylic polymer microspheres, such as those made of crosslinked acrylate copolymer Polytrap 6603 Adsorber from the company RP Scherer, and those made of polymethyl methacrylate Micropearl M 100 from the company SEPPIC;



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polyurethane powder, such as the powdered copolymer of hexamethylene diisocyanate and of trimethylol hexyl lactone sold under the names Plastic Powder D-400 and T-7 by the company Toshiki;

polymer microcapsules that comprise a single closed cavity and form a reservoir, which may contain a liquid, especially a cosmetic active agent; they are prepared via known processes such as those described in U.S. Pat. No. 3,615,972 and EP-A-056 219. They may be made, for example, of polymers or copolymers of ethylenically unsaturated acid, amine or ester monomers, of urea-formaldehyde polymers or of vinylidene chloride polymers or copolymers; by way of example, mention may be made of microcapsules made of methyl acrylate or methacrylate polymers or copolymers, or alternatively of copolymers of vinylidene chloride and of acrylonitrile; among these polymers, mention will be made especially of those containing 20-60% by weight of units derived from vinylidene chloride, 20-60% by weight of units derived from acrylonitrile and 0-40% by weight of other units such as units derived from an acrylic and/or styrene monomer; crosslinked acrylic polymers or copolymers may also be used;

elastomeric crosslinked organopolysiloxane spherical powders, described especially in document JP-A-02 243 612, such as those sold under the name Trefil Powder E-506C by the company Dow Corning;

the carnauba wax microbeads sold under the name Microcare 350® by the company Micro Powders and the paraffin wax microbeads sold under the name Microease 114S® by the company Micro Powders;

metal soaps in powder form. Among these soaps, mention may be made especially of metal soaps of fatty acids containing from 12 to 22 carbon atoms and in particular those containing from 12 to 18 carbon atoms. The metal of the metal soap may especially be zinc or magnesium. The fatty acid may be chosen especially from lauric acid, myristic acid, stearic acid and palmitic acid. The metal soaps that may be used include zinc laurate, magnesium stearate, magnesium myristate and zinc stearate, and mixtures thereof;

talcs or hydrated magnesium silicates, especially in the form of particles generally less than 40 µm in size;

micas or aluminosilicates of varied composition that are especially in the form of flakes from 2 to 200 µm and preferably 5-70 µm in size and from 0.1 to 5 µm and preferably 0.2-3 µm in thickness, these micas possibly being of natural origin (for example muscovite, margarite, roscoelite, lepidolite or biotite) or of synthetic origin;

clays such as sericites, which belong to the same chemical and crystalline class as muscovite;

kaolin or hydrated aluminium silicate, which is especially in the form of particles of isotropic forms generally less than 30 µm in size;

boron nitrides;

powders of tetrafluoroethylene polymers, such as Ceridust 9205 F from the company Clariant;

precipitated calcium carbonate, especially in the form of particles greater than 10 µm in size;

magnesium carbonate and magnesium hydrogen carbonate;

hydroxyapatite;

powders of non-expanded synthetic polymers, such as polyethylene, polyesters (for example polyethylene isophthalate or terephthalate) and polyamides (for example Nylon), in the form of particles less than 50 µm in size;

powders of spheronized, crosslinked or non-crosslinked synthetic polymers, for instance polyamide powders such as poly-β-alanine powder or Nylon powder, for example

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Orgasol powder from the company Atochem, polyacrylic acid or polymethacrylic acid powder, powders of polystyrene crosslinked with divinylbenzene, and silicone resin powders, and

bismuth oxychloride powders,

powders of organic materials of natural origin, for instance starches, especially corn starch, wheat starch or rice starch; and mixtures thereof.

A composition according to the invention is advantageously totally free of filler with a refractive index of greater than 1.8.

As representatives of such fillers, mention may especially be made of titanium oxides, zinc oxides and bismuth oxychloride powders.

The additional fillers may be present in the composition in a content ranging from 0.01% to 20% by weight and preferably ranging from 0.1% to 5% by weight relative to the total weight of the composition.

According to one advantageous variant, a composition according to the invention may contain as filler a polyurethane powder and/or mica.

Advantageously, a composition according to the invention may comprise a total content of fillers ranging from 0.01% to 20% by weight, preferably ranging from 0.1% to 10% by weight and preferentially ranging from 0.1% to 5% by weight, relative to the total weight of the composition.

As stated above, a composition according to the invention may also comprise, in its pulverulent phase, at least one colouring agent.

The said at least one colouring agent or dyestuff according to the invention preferably comprises pigments, nacres, reflective particles, colorants that are soluble in polar solvents, and/or mixtures thereof.

According to one particular embodiment, the composition according to the present invention is characterized in that the said at least one colouring agent is present in a content ranging from 0.01% to 10% by weight, in particular from 0.1% to 5% by weight and more preferentially from 0.5% to 2% by weight relative to the total weight of the composition; preferably, the said at least one colouring agent comprises at least one pigment, which is preferentially organic.

Pigments

The term "pigments" should be understood as meaning white or coloured, mineral or organic particles of any form, which are insoluble in the physiological medium and are intended to colour the composition.

The pigments may be white or coloured, and mineral and/or organic.

Among the mineral pigments that may be mentioned are titanium dioxide, optionally surface-treated, zirconium oxide or cerium oxide, and also zinc oxide, iron (black, yellow or red) oxide or chromium oxide, manganese violet, ultramarine blue, chromium hydrate and ferric blue, and metal powders, for instance aluminium powder and copper powder.

The organic pigments may be chosen from the materials below, and mixtures thereof:

cochineal carmine,

organic pigments of azo dyes, anthraquinone dyes, indigoid dyes, xanthene dyes, pyrene dyes, quinoline dyes, triphenylmethane dyes and fluoran dyes.

Among the organic pigments, mention may be made especially of the D&C certified pigments known under the following names: D&C Blue No. 4, D&C Brown No. 1, D&C Green No. 5, D&C Green No. 6, D&C Orange No. 4, D&C Orange No. 5, D&C Orange No. 10, D&C Orange No. 11, D&C Red No. 6, D&C Red No. 7, D&C Red No. 17, D&C Red No. 21, D&C Red No. 22, D&C Red No. 27, D&C Red

No. 28, D&C Red No. 30, D&C Red No. 31, D&C Red No. 33, D&C Red No. 34, D&C Red No. 36, D&C Violet No. 2, D&C Yellow No. 7, D&C Yellow No. 8, D&C Yellow No. 10, D&C Yellow No. 11, FD&C Blue No. 1, FD&C Green No. 3, FD&C Red No. 40, FD&C Yellow No. 5, FD&C Yellow No. 6.

The chemical materials corresponding to each of the organic dyestuffs mentioned previously are mentioned in the publication "International Cosmetic Ingredient Dictionary and Handbook", 1997 edition, pages 371 to 386 and 524 to 528, published by The Cosmetic, Toiletries and Fragrance Association, the content of which is incorporated into the present patent application by reference.

According to one particular embodiment of the invention, the pigments may be treated or coated with a treatment agent.

The treatment agent may be chosen from alkoxysilanes, silicones such as methicones, dimethicones, and perfluoroalkylsilanes; fatty acids such as stearic acid; metal soaps such as aluminium dimyristate, the aluminium salt of hydrogenated tallow glutamate, perfluoroalkyl phosphates, perfluoroalkylsilanes, perfluoroalkylsilazanes, polyhexafluoropropylene oxides, polyorganosiloxanes comprising perfluoroalkyl perfluoropolyether groups, amino acids, N-acylamino acids or salts thereof; lecithin, isopropyl triisostearyl titanate, and mixtures thereof.

The N-acylamino acids may comprise an acyl group containing from 8 to 22 carbon atoms, for instance a 2-ethylhexanoyl, caproyl, lauroyl, myristoyl, palmitoyl, stearoyl or cocoyl group. The salts of these compounds may be the aluminium, magnesium, calcium, zirconium, zinc, sodium or potassium salts. The amino acid may be, for example, lysine, glutamic acid or alanine.

According to a preferred variant, a composition according to the invention may comprise a total content of pigments ranging from 0.01% to 70% by weight, preferably ranging from 0.1% to 50% by weight and preferentially ranging from 0.01% to 40% by weight, relative to the total weight of the composition.

When it is a makeup product, a pigment content ranging from 0.01% to 40% by weight, preferably from 0.1% to 30% by weight and in particular from 0.1% to 20% by weight relative to the total weight of the said composition will generally be used.

According to another embodiment variant, a composition according to the invention may be free of pigments.

The pulverulent phase according to the invention may also comprise, or may even be formed from, nacres and/or reflective particles.

The term "nacre" should be understood as meaning coloured particles of any form, which may or may not be iridescent, especially produced by certain molluscs in their shell, or alternatively synthesized, and which have a colour effect via optical interference.

Examples of nacres that may be mentioned include nacreous pigments such as titanium mica coated with an iron oxide, mica coated with bismuth oxychloride, titanium mica coated with chromium oxide, and nacreous pigments based on bismuth oxychloride. They may also be mica particles at the surface of which are superposed at least two successive layers of metal oxides and/or of organic dyestuffs.

The nacres may more particularly have a yellow, pink, red, bronze, orangey, brown, gold and/or coppery colour or glint.

As illustrations of nacres that may be introduced into the composition, mention may be made of the gold-coloured nacres sold especially by the company Engelhard under the name Brilliant gold 212G (Timica), Gold 222C (Cloisonne), Sparkle gold (Timica), Gold 4504 (Chromalite) and Monarch

gold 233X (Cloisonne); the bronze nacres sold especially by the company Merck under the name Bronze fine (17384) (Colorona) and Bronze (17353) (Colorona) and by the company Engelhard under the name Super bronze (Cloisonne); the orange nacres sold especially by the company Engelhard under the name Orange 363C (Cloisonne) and Orange MCR 101 (Cosmica) and by the company Merck under the name Passion orange (Colorona) and Matte orange (17449) (Microna); the brown nacres sold especially by the company Engelhard under the name Nu-antique copper 340XB (Cloisonne) and Brown CL4509 (Chromalite); the nacres with a copper tint sold especially by the company Engelhard under the name Copper 340A (Timica); the nacres with a red tint sold especially by the company Merck under the name Sienna fine (17386) (Colorona); the nacres with a yellow tint sold especially by the company Engelhard under the name Yellow (4502) (Chromalite); the red nacres with a gold tint sold especially by the company Engelhard under the name Sunstone G012 (Gemtone); the pink nacres sold especially by the company Engelhard under the name Tan opale G005 (Gemtone); the black nacres with a gold tint sold especially by the company Engelhard under the name Nu antique bronze 240 AB (Timica), the blue nacres sold especially by the company Merck under the name Matte blue (17433) (Microna), the white nacres with a silvery tint sold especially by the company Merck under the name Xirona Silver, and the golden-green pink-orange nacres sold especially by the company Merck under the name Indian summer (Xirona), and mixtures thereof.

Still as examples of nacres, mention may also be made of particles comprising a borosilicate substrate coated with titanium oxide.

Particles having a glass substrate coated with titanium oxide are especially sold under the name Metashine MC1080RY by the company Toyol.

Finally, examples of nacres that may also be mentioned include polyethylene terephthalate flakes, especially those sold by the company Meadowbrook Inventions under the name Silver 1P 0.004X0.004 (silver flakes).

According to one particular variant, the compositions according to the invention may comprise from 0 to 40%, for example 0.1% to 20% and better still 0.5% to 10% by weight of nacres. More preferentially, they contain less than 40% by weight of nacres. According to one particular embodiment, the composition according to the invention is free of nacres.

Finally, the colouring agent according to the invention may comprise reflective particles.

The term "reflective particles" denotes particles whose size, structure, especially the thickness of the layer(s) of which they are made and their physical and chemical nature, and surface state, allow them to reflect incident light. This reflection may, where appropriate, have an intensity sufficient to create at the surface of the composition or of the mixture, when it is applied to the support to be made up, points of overbrightness that are visible to the naked eye, i.e. more luminous points that contrast with their environment by appearing to sparkle.

The reflective particles may be selected so as not to significantly alter the colouration effect generated by the colouring agents with which they are combined, and more particularly so as to optimize this effect in terms of colour yield. They may more particularly have a yellow, pink, red, bronze, orange, brown, gold and/or coppery colour or tint.

These particles may have varied forms and may especially be in platelet or globular form, in particular in spherical form.

The reflective particles, whatever their form, may or may not have a multilayer structure and, in the case of a multilayer

structure, may have, for example, at least one layer of uniform thickness, in particular of a reflective material.

When the reflective particles do not have a multilayer structure, they may be composed, for example, of metal oxides, especially titanium or iron oxides obtained synthetically.

When the reflective particles have a multilayer structure, they may comprise, for example, a natural or synthetic substrate, especially a synthetic substrate at least partially coated with at least one layer of a reflective material, especially of at least one metal or metallic material. The substrate may be made of one or more organic and/or inorganic materials.

More particularly, it may be chosen from glasses, ceramics, graphite, metal oxides, aluminas, silicas, silicates, especially aluminosilicates and borosilicates, and synthetic mica, and mixtures thereof, this list not being limiting.

The reflective material may comprise a layer of metal or of a metallic material. Reflective particles are described especially in documents JP-A-09188830, JP-A-10158450, JP-A-10158541, JP-A-07258460 and JP-A-05017710.

Again as an example of reflective particles comprising a mineral substrate coated with a layer of metal, mention may also be made of particles comprising a silver-coated borosilicate substrate.

Particles with a silver-coated glass substrate, in the form of platelets, are sold under the name Microglass Metashine REFSX 2025 PS by the company Toyal. Particles with a glass substrate coated with nickel/chromium/molybdenum alloy are sold under the name Crystal Star GF 550 and GF 2525 by this same company.

Use may also be made of particles comprising a metallic substrate such as silver, aluminium, iron, chromium, nickel, molybdenum, gold, copper, zinc, tin, manganese, steel, bronze or titanium, the said substrate being coated with at least one layer of at least one metal oxide such as titanium oxide, aluminium oxide, iron oxide, cerium oxide, chromium oxide or silicon oxides, and mixtures thereof.

Examples that may be mentioned include aluminium powder, bronze powder or copper powder coated with SiO<sub>2</sub> sold under the name Visionaire by the company Eckart.

Preferably, the pulverulent phase comprises at least one compound chosen from:

organic pigments such as, for example:

the pigments certified D&C by the Food & Drug Administration as listed in the section "Color Additives—Batch Certified by the U.S. Food and Drug Administration" of the CTFA; mention may be made especially of Blue 1 and 4, Brown 1, Ext. Violet 2, Ext. Yellow 7, Green 3, 5, 6 and 8, Orange 4, 5, 10 and 11, Red 4, 6, 7, 17, 21, 22, 27, 28, 30, 36 and 40, Violet 2, Yellow 5, 6, 7, 8, 10 and 11,

mineral pigments such as:

iron oxide, zirconium oxide, cerium oxide, zinc oxide, iron oxide or chromium oxide, ferric blue, manganese violet, ultramarine blue, pink or violet, chromium hydrate or chromium hydroxide, naces such as, for example: mica coated with titanium oxide, mica coated with titanium oxide and iron oxide, and mica coated with an amino acid such as lauroyl lysine, polyethylene terephthalate flakes, sericite,

and mixtures thereof,

reflective particles such as, for example:

particles comprising a borosilicate substrate coated with a metallic layer.

A composition according to the invention may also comprise water-soluble or liposoluble dyes in a content ranging

from 0.01% to 10% by weight and especially ranging from 0.01% to 5% by weight relative to the total weight of the composition.

The liposoluble dyes are, for example, Sudan Red, DC Red 17, DC Green 6,  $\beta$ -carotene, soybean oil, Sudan Brown, DC Yellow 11, DC Violet 2, DC Orange 5 and quinoline yellow. The water-soluble dyes are, for example, beetroot juice or methylene blue.

A composition according to the invention may be in the form of a makeup composition product such as a nail varnish, a foundation, a liquid lipstick, a mascara, an anti-wrinkle composition, a skincare composition, or a haircare composition such as a lacquer, a styling lotion or a styling spray.

As hair composition, a composition according to the invention may be used in particular to obtain a hairstyling, hairstyle hold or fixing effect. In particular, the composition may be used for finishing or construction, on dry or wet hair, and optionally with the aid of a heating device.

Among such hair compositions, mention may be made of those for obtaining an improvement in the remanence of compounds inserted into the fibre (for example colorants), or for holding tight on the hair a compound such as photoprotective screening agents or pigments or friction-lowering compounds.

As skincare agent, a composition according to the invention may be used for resistance or beautifying purposes, for treating wounds, or for injecting or antiwrinkle purposes for filling hollow areas of the skin.

A composition according to the invention is more preferentially a nail varnish, the said nail varnish possibly being transparent or coloured.

As nail varnishes, mention may be made of a varnish base or a nailcare product.

A composition according to the invention comprises a physiologically acceptable medium.

The term "physiologically acceptable medium" means a non-toxic medium that may be applied to human keratin materials and that has a pleasant appearance, odour and feel.

Thus, the composition according to the present invention may be applied either by finger or by using a brush or a felt-tip pen. Such a pen is described, for example, in document FR 2 909 844.

## EXAMPLE

The example given below is presented as a non-limiting illustration of the invention.

In the example that follows, the references of the starting materials used are listed below:

(chloromethyl)triethoxysilane: 391042 (Sigma Aldrich)

potassium cyanate: 215074 (Sigma Aldrich)

bisphenol A: 239658 (Sigma Aldrich)

dibutyltin dilaurate: 34930 (Sigma Aldrich)

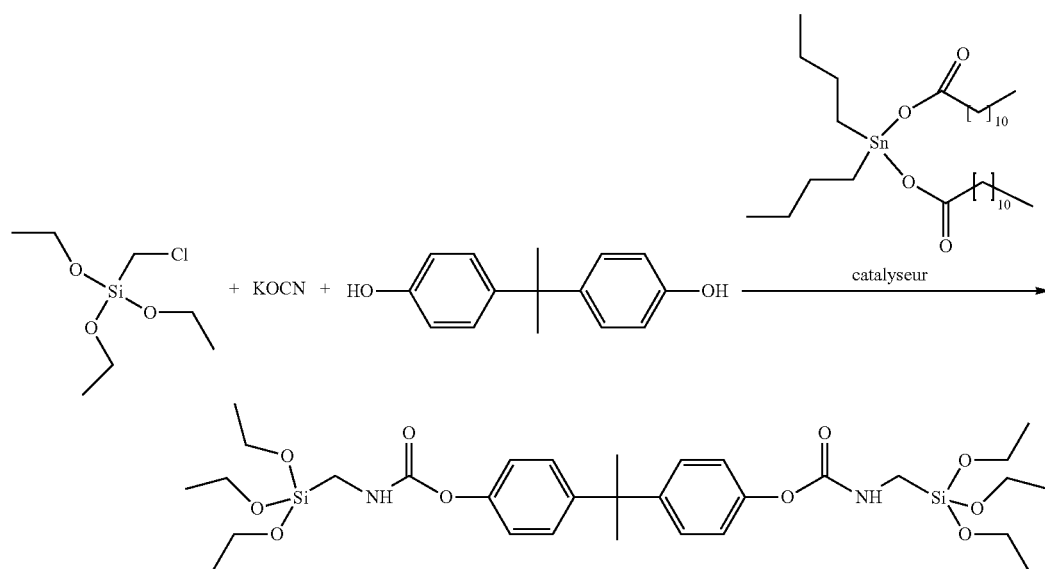
## Example 1

Compound Obtained by Reaction Between  
(chloromethyl)triethoxysilane, Potassium Cyanate  
and Bisphenol A

The synthesis is performed according to the following reaction scheme:

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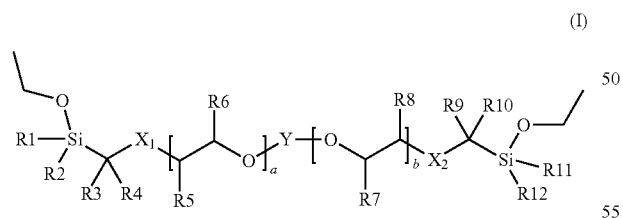


(Chloromethyl)triethoxysilane (6.26 g, 29 mmol), potassium cyanate (2.90 g, 36 mmol) and bisphenol A (3.12 g, 14 mmol) are added to dry dimethylformamide (25 mL) under nitrogen. The reaction mixture is heated at reflux at 120° C. for 6 hours under nitrogen. Dibutyltin dilaurate (0.6 mg, 50 ppm) is then added to the mixture under nitrogen, and the mixture is then refluxed at 120° C. for 18 hours under nitrogen. The reaction mixture is then cooled to room temperature, filtered under nitrogen and concentrated under vacuum. Toluene is added (100 mL) under nitrogen, the precipitated salt is filtered off under nitrogen and the solvent is evaporated off under vacuum.

The compound obtained is diluted to 50% under nitrogen in ethyl acetate. The solution obtained is applied to a keratin material such as the skin, the nails, the hair or the eyelashes, and forms, after reaction with atmospheric moisture, a strong, adherent film.

The invention claimed is:

1. A cosmetic composition, comprising the compound of chemical formula (I):



in which:

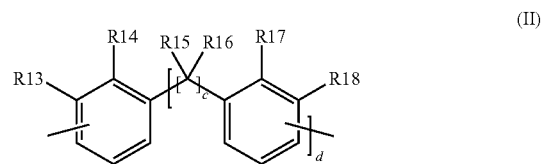
a and b are each independently an integer between 0 and 20;

R1, R2, R11 and R12 are each independently an ethoxy group, a group (C<sub>1</sub>-C<sub>20</sub>)alkyl optionally substituted with an amino group;

R3, R4, R5, R6, R7, R8, R9 and R10 are each independently a hydrogen atom or a group (C<sub>1</sub>-C<sub>10</sub>)alkyl;

X1 and X2 are each independently a carboxyl, carbamate, amide, carbonate, ureido or sulfonate group, an oxygen atom or a NH group;

Y is a hydrocarbon-based group comprising from 2 to 800 carbon atoms; and wherein the hydrocarbon-based group is a linear or branched divalent group bearing one or more aromatic or non-aromatic rings; said hydrocarbon-based group being selected from the group consisting of formulae (II) and (III):

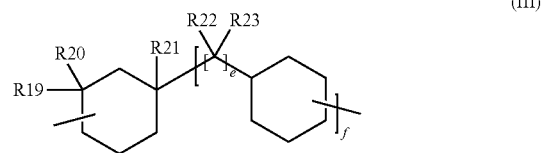


in which:

c is an integer between 0 and 10;

d is an integer between 0 and 3;

R13, R14, R15, R16, R17 and R18 are each independently a hydrogen atom or a group (C<sub>1</sub>-C<sub>10</sub>)alkyl;



in which:

e is an integer between 0 and 10;

f is an integer between 0 and 3;

R19, R20, R21, R22 and R23 are each independently a hydrogen atom or a group (C<sub>1</sub>-C<sub>10</sub>)alkyl; said composition being able to form a film.

2. The composition of claim 1, wherein a and b are each independently an integer between 0 and 3.

3. The composition of claim 1, wherein R1, R2, R11 and R12 are each independently a methyl group, an ethoxy group or a group (C<sub>1</sub>-C<sub>3</sub>)aminoalkyl.

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4. The composition of claim 1, wherein R3, R4, R5, R6, R7, R8, R9 and R10 are each independently a methyl group or a hydrogen atom.

5. The composition of claim 1, wherein X1 and/or X2 are a carbamate group.

6. The composition of claim 1, wherein the compound of chemical formula (I) is present in the composition in a content of greater than or equal to 20% by weight relative to the total weight of the composition.

7. The composition of claim 1, wherein the composition is anhydrous.

8. The composition of claim 1, wherein the composition has a solid content of greater than or equal to 20% by weight relative to the total weight of the composition.

9. The composition of claim 1, wherein the composition further comprises a compound comprising at least one member selected from the group consisting of:

an alkoxysilane group;

a plasticizer;

a film-forming polymer;

a wax;

a pasty fatty substance; and

a pulverulent phase comprising a filler and/or a colouring agent.

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10. The composition of claim 9, wherein at least one colouring agent is present in a content in the range of 0.01% to 10% by weight relative to the total weight of the composition.

11. The composition of claim 1, wherein the composition further comprises at least one polar volatile solvent selected from the group consisting of lower monoalcohols comprising from 1 to 5 carbon atoms, C<sub>3</sub>-C<sub>4</sub> ketones, C<sub>2</sub>-C<sub>4</sub> aldehydes, and C<sub>2</sub>-C<sub>4</sub> short-chain esters.

12. The composition of claim 1, wherein the composition is in the form of a makeup composition.

13. A cosmetic method, comprising:

applying the cosmetic composition of claim 1 to a keratin material.

14. The composition of claim 12, wherein the composition may be in the form of a nail varnish, a liquid lipstick, a mascara, an anti-wrinkle composition, a skincare composition, or a hair care composition.

15. The method of claim 13, wherein the keratin material is nails, hair or a combination thereof.

\* \* \* \* \*